Write your name here

Surname	Other names

Pearson Edexcel GCE

Centre Number | | | | | |

Candidate Number | | | | |

Design and Technology

Product Design: Graphic Products
Advanced Subsidiary
Unit 2: Design and Technology in Practice

Monday 22 May 2017 – Morning
Time: 1 hour 30 minutes

Paper Reference
6GR02/01

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches it must be dark (HB or B). Coloured pens, pencils and highlighter pens must not be used.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need.*

Information

- The total mark for this paper is 70.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question.*
- Questions labelled with an **asterisk** (*) are ones where the quality of your written communication will be assessed
  – *you should take particular care on these questions with your spelling, punctuation and grammar, as well as the clarity of expression.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

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1/1/1/1/1/1

P 4 9 1 2 2 A 0 1 1 6

Pearson

Answer ALL questions. Write your answers in the spaces provided.

1 (a) Paper and board are used for a wide range of graphic products, with the selection of specific types of paper or board being decided by their properties.

Complete the table below by identifying **two** properties of each material, and **one** specific example of the use of each material.

Paper type	Material properties	Example of use
Tracing paper	1) ..... 2) ..... **(2)**	..... **(1)**
Copier paper	1) ..... 2) ..... **(2)**	..... **(1)**

(b) Pulp is used in the production of paper and board.

Outline the process of producing mechanical pulp.

(4)

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(c) Explain **one** advantage of using chemical pulp instead of mechanical pulp in the manufacture of paper.

(2)

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(Total for Question 1 = 12 marks)

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2 When producing graphic products there are a number of health and safety issues that should be considered.

(a) Complete the table to identify **two** potential health and safety risks when using computers for design work for long periods of time. For each risk suggest an appropriate control measure.

Risk	Control measure
1) ..... **(1)**	.... **(1)**
2) ..... **(1)**	.... **(1)**

(b) Explain **one** reason why it is important to keep completed risk assessments.

(2)

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(Total for Question 2 = 6 marks)

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3 Smart materials and technologies are used to enhance graphic products by either improving the aesthetics or the function of the product.

(a) Explain how thermochromic liquid crystals are used to indicate how much charge is remaining in a battery.

(4)

(b) 'Smart' labels that have radio frequency identification (RFID) tags can be used as an alternative to bar codes for labelling products.

Discuss how the use of 'smart' labels containing RFID tags impacts on the supply chain from manufacturer to end user.

(5)

(Total for Question 3 = 9 marks)

4 Many modern graphic products are designed and manufactured using computer-aided design (CAD) and computer-aided manufacturing (CAM).

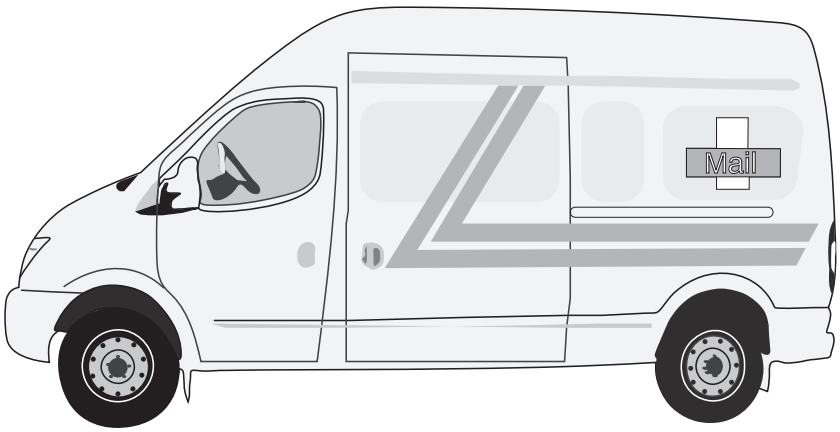

Figure 1

(a) Figure 1 shows a van that has graphics in the form of vinyl cut signage.

Outline the process of applying vinyl cut signage.

(4)

(b) Explain **one** advantage and **one** disadvantage of using a 2D image creation software package to design the graphics for the van.

(4)

Advantage

Disadvantage

(Total for Question 4 = 8 marks)

5 Figure 2 shows an illuminated shop sign that has been manufactured using the vacuum forming process.

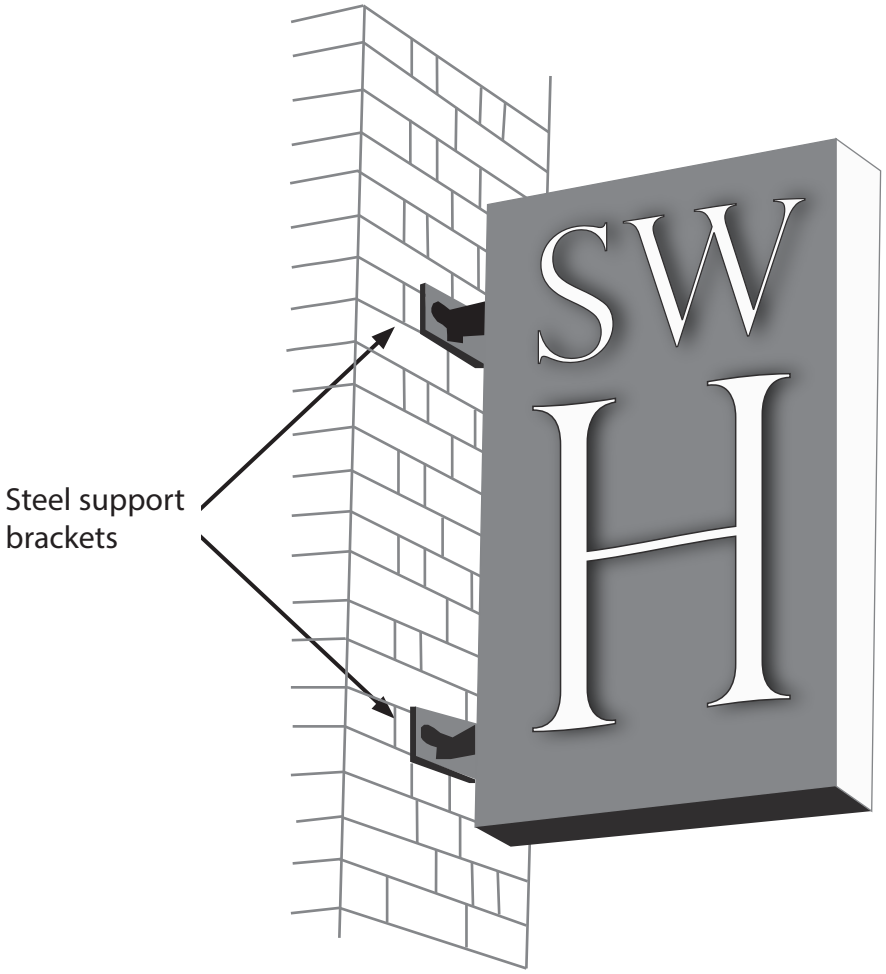

Figure 2

One stage of the vacuum forming process is to produce a former.

(a) Describe, using annotated sketches, the other stages of the vacuum forming process.

(4)

(b) Explain **one** advantage and **one** disadvantage of producing the sign using the vacuum forming process.

(4)

Advantage

Disadvantage

*(c) The support brackets which attach the sign to the wall are made from steel.

Evaluate the use of steel for the support brackets, with reference to aesthetic, functional and mechanical properties.

(6)

(Total for Question 5 = 14 marks)

6 Figure 3 shows a detergent bottle that has been produced from high density polyethylene (HDPE) using the blow moulding process.

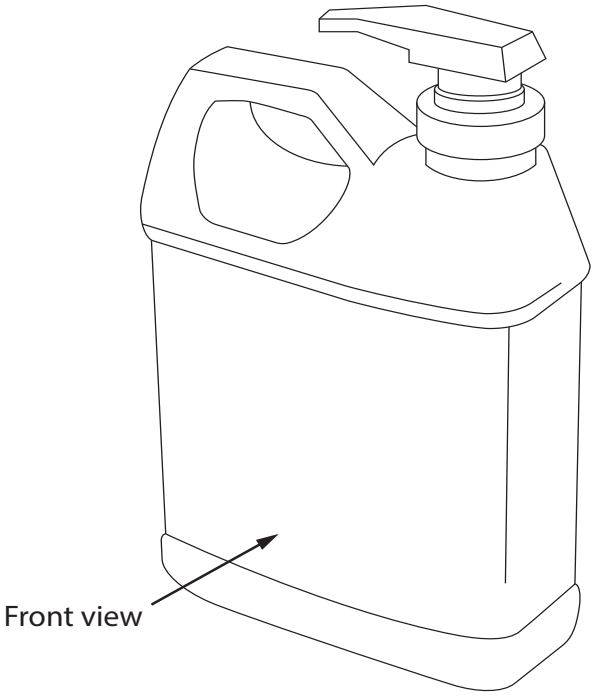

Figure 3

(a) Sketch, in the space below, a third angle orthographic projection of the detergent bottle.

(6)

(b) The detergent bottle is manufactured using high density polyethylene (HDPE), which is suitable for blow moulding.

Explain **two** further reasons why high density polyethylene (HDPE) is used for the manufacture of the detergent bottle.

(4)

1 .....

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2 .....

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(c) The screw cap for the detergent bottle is produced by injection moulding.

Outline the checks that need to be carried out on the materials and equipment in preparation for the injection moulding of the screw cap.

(5)

(Total for Question 6 = 15 marks)

***7** Evaluate the use of computer-aided inspection as a part of quality control (QC).

(Total for Question 7 = 6 marks)

TOTAL FOR PAPER = 70 MARKS